Preliminary Alternative 28
Corresponding to Alternative Formulation Strategy 1A, 2B, 3B, 4B- Max)

Primary Conflict	**Approach to Resolve Conflict**
Fisheries and Diversions (Conflict 1)	**Increase Fish Productivity (1A)** Diversion Modification (1B)
Habitat and Land Use/Flood Protection (Conflict 2)	Preserve Existing Land Use (2A) **Create Additional Habitat Area (2B)**
Water Supply Availability and Beneficial Uses (Conflict 3)	Reduce Critical Export Area Demands (3A) **Enhance Delta Supplies as Inflows (3B)**
Water Quality and Land Use (Conflict 4)	Managing Quality of Delta Inflow (4A) **Manage Instream/In-Delta Water Quality (4B)**
Minimum or **Maximum**	

Solution Overview

Preliminary Alternative 28 generates substantial new benefits. This particular strategy relies upon boosting fish productivity, creation of habitat, increases in water availability north of the Delta, and reduction in the impact of toxics -- all at a maximal level. Thus, the solution generates: significant amounts of new habitat, both aquatic and terrestrial; environmental flows and user water supplies (via storage and demand management in and above the Delta); removal of some barriers and the installation of other barriers to promote fish migration; hatcheries for salmon; an environmentally friendly through Delta water transfer scheme; Some measures to reduce the impacts of salinity; and levee and flood control improvements.

Actions Selected

Habitat - Habitats are improved across the board. All types of aquatic, wetland, and terrestrial habitat are enhanced, both in and out of the Delta. Improvements include restoration of habitat, and removal and installation of barriers as needed to channel migrating anadromous fish away from bad habitat and into good habitat. Improvements are also made in upstream temperature patterns for salmon.
Populations - Measures are taken to boost commercial and recreational fish populations through hatcheries. Also, measures are taken to discriminate against undesirable species via exotic species control and predator control.
Diversions - This strategy does not allow for measures aimed at reducing the impacts of diversions on fish. However, the impact of existing diversion points is reduced via habitat improvements. In particular, this alternative includes significant restoration of shallow water habitat in the Central Delta. this restoration should reduce net velocities toward the pumps and should reduce the impacts of pumping from the South Delta. Also, the capacity of the export facilities is increased to allow greater diversions of water during periods of low impact. In this way, export supplies can be increased without cutting into environmental supplies.
Water use - All types of environmental flows are improved, including transport, attraction, and baseline flows. Exports also increase, as described under "Diversions". Improved flows are generated partly through demand management in and above the Delta, but primarily through major new storage elements in and above the Delta -- a combination of on-stream, off stream, and groundwater storage. In this way, wet period flows are captured for use during periods of high competition.

Water quality - Barriers are installed in the South Delta to reduce the salinity of wate for farming and weirs are installed to reduce salinity intrustion.
Land use/ levees/ flood control - Significant amounts of existing land uses are converted into both habitat and water storage. Major efforts are made to protect levees better. The creation of floodways in the upstream areas as habitat should improve flood control protection.
Institutions - A number of institutional changes may be necessary for this alternative, including: changes in law to promote groundwater storage and conjunctive use; better regulation of commercial and recreational fishing; water pricing measures, funding mechanisms, and the development of institutions to assure that the system is operated as promised in the future.

Preliminary Assessment

The proposed alternative is a significant improvement from the no action case. It should greatly expand fish habitat and populations while allowing for increased diversions. Its weaknesses have to do with the absence of actions which are ruled out by this strategy. In particular, south of Delta storage and other methods of reducing the draw on the Delta by the export areas are ruled out. Similarly, efforts aimed at reducing the impacts of diversions (screening, shifting intake points) are also ruled out. This means that export areas continue to heavily constrained in the Delta, with problems moving water during periods of high environmental sensitivity (because of the location of the intakes) and limitations on the ability to move and store water during periods of low environmental sensitivity. Finally, restrictions on the ability to include actions dealing the pollution source control mean that water quality will remain degraded.

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Alternative 2B
(1A , 2B, 3B, 4B - MAX)

Category	Actions Selected	Functional Basis for Inclusion	Specification for Action Implementation
Restoration of Delta Shallow Water (Tidal) Habitat	-Convert existing leveed lands to tidal action	Habitat	
	-Protect existing shallow habitat from erosion	Habitat	
	-Restore tidal action to existing diked wetlands	Habitat	
	-Reconstruct levees to include shallow water habitat	Habitat	
	-Fill deep water to produce shallow habitat	Habitat	
Restoration of Delta Riverine Habitat	-Reconstruct river banks and shallow areas	Habitat	
	-Restore/preserve channel islands	Habitat	
	-Restore natural channel configurations	Habitat	
	-Modify construction practices to include riverine elements	Habitat	
Restoration of Delta Riparian Habitat	-Improve and protect degraded riparian habitats	Habitat	
	-Establish new areas of riparian habitat	Habitat	
	-Reestablish historic riparian areas	Habitat	
	-Modify levee maintenance practices	Habitat	
	-Protect existing riparian habitat	Habitat	
Restoration of Delta Wetland Habitat	-Expand wetland acquisition programs	Habitat	
	-Convert agricultural lands to wetlands	Habitat	
Restoration of Delta Terrestrial Habitat		Habitat	
Integrated Habitat Management Programs		Habitat	
Establishment of Floodways and Meander Belts	-Relocate levees to widen floodways	Habitat	
	-Allow river channels to meander	Habitat	
	Acquire Delta Islands as overflow areas	Habitat	
	-Restore floodways as habitat corridors	Habitat	
Control of Introduced Species	-Remove or reduce nuisance species in key habitats	Habitat	
	-Inspect for invasions of nuisance species	Habitat	
	-Modify habitat to favor native species	Habitat	
Delta Waterfowl Habitat Management	-Manage crops for waterfowl forage production	Habitat	
	-Improve management of public waterfowl areas	Habitat	
	- Implement terrestrial predator control programs	Habitat	
	-Increase sources and availability of wildlife forage	Habitat	
Restoration of Upstream Anadromous Fish Habitat	-Manage flows and temperatures in upstream habitats	Habitat	
	-manage flows in upstream habitats	Habitat	
	-manage temperatures in upstream habitats	Habitat	
	-Restore and replenish spawning gravels	Habitat	
	-Restore channel configurations	Habitat	
	-Restore shoreline habitat conditions	Habitat	
	-Improve floodway drainage to reduce fish stranding	Habitat	
Physical Improvements for Fish Passage	-Modify passage at upstream dams/other barriers	Habitat	
	-Modify natural barriers to improve passage	Habitat	
Restoration of Upstream Riparian Habitat	-Restrict livestock grazing in riparian corridors	Habitat	
	-Revegetate degraded riparian habitats	Habitat	
	-Protect riparian lands through purchase/easements	Habitat	
Restoration of Upstream Wetland Habitat	-Modify floodways to support wetland habitats	Habitat	
	-Reuse agricultural drainage to create wetlands	Habitat	
	-Reuse urban wastewater effluent to create wetlands	Habitat	
	-Manage groundwater recharge for wetland habitat	Habitat	
Delta Inflow Management	-Decrease upstream diversions	Water Use	
	-Modify upstream reservoir operations	Water Use	
	-Provide instream pulse flows for fish passage	Water Use	
	-Provide instream flows for fish attraction	Water Use	
Acquire Water Supplies for Fish and Wildlife	-Acquire water to augment instream flows	Water Use	
	-Acquire water for refuge habitat use	Water Use	
	-Obtain shifts in timing of instream flows	Water Use	
	-Modify water law to establish instream rights	Institutional	
Installation of Barriers to Guide Fish Movement	-Install barriers to divert fish from Sacramento to western chann	Populations	
Fish Hatchery Operations	-Expand hatchery capacities	Populations	
	-Construct new hatcheries on the San Joaquin R.	Populations	

	-Improve hatchery operations	Populations	
	-Reduce hatchery effects on wild fish populations	Populations	
	-Implement tagging of hatchery-bred fish	Populations	
	-Establish new captive breeding programs	Populations	
Fish Harvest Management	-Improve regulation of commercial take	Institutional	
	-Improve regulation of recreational take	Institutional	
	-Improve enforcement of harvest regulations	Institutional	
Desalination	-Expand desalination of San Joaquin Valley supplies	Water Use	
Water Conservation	-Increase use of district-wide conservation practices	Water Use	Upstream of Delta/In Delta only
	-Increase use of on-farm conservation practices	Water Use	Upstream of Delta/In Delta only
	-Increase use of municipal conservation practices	Water Use	Upstream of Delta/In Delta only
	-Increase use of industrial conservation practices	Water Use	Upstream of Delta/In Delta only
	-Implement financial incentive policies	Water Use	Upstream of Delta/In Delta only
	-Educate users about conservation technologies	Water Use	Upstream of Delta/In Delta only
	-Implement conservation-oriented rate structures	Water Use	Upstream of Delta/In Delta only
Water Reclamation	-Recharge groundwater with reclaimed water	Water Use	Upstream of Delta/In Delta only
	-Use reclaimed water for agricultural irrigation	Water Use	Upstream of Delta/In Delta only
	-Reclaim saline agricultural drainage water	Water Use	Upstream of Delta/In Delta only
	-Recycle and treat water for potable reuse	Water Use	Upstream of Delta/In Delta only
	-Use reclaimed water for nonpotable urban uses	Water Use	Upstream of Delta/In Delta only
	-Use reclaimed water for landscape irrigation	Water Use	Upstream of Delta/In Delta only
	-Use reclaimed water for power plant cooling	Water Use	Upstream of Delta/In Delta only
	-Use reclaimed water for industrial processes	Water Use	Upstream of Delta/In Delta only
	-Use reclaimed water to repel salinity intrusion	Water Use	Upstream of Delta/In Delta only
	-Improve reclamation technologies and cost	Water Use	Upstream of Delta/In Delta only
	-Educate public about water reclamation	Water Use	Upstream of Delta/In Delta only
Land Retirement and Fallowing	-Encourage land fallowing during drought periods	Water Use	
	-Develop incentive programs for land retirement	Water Use	
	-Purchase lands or easements	Water Use	
Water Pricing	-Establish incentives for pricing to reduce demand	Water Use	Upstream of Delta/In Delta only
	-Educate users about pricing feasibility	Water Use	Upstream of Delta/In Delta only
	-Remove legal obstacles to pricing incentive programs	Institutional	Upstream of Delta/In Delta only
Watershed Management	-Manage vegetation cover to increase yield	Water Use	
	-Manage land uses to protect water quality	Water Quality	
	-Modify weather to increase precipitation	Water Use	
New or Expanded On-Stream Storage	-Construct new storage north of Delta	Water Use	
	-Enlarge existing on-stream storage reservoirs	Water Use	
	-Modify operations of existing on-stream reservoirs	Water Use	
New or Expanded Off-Stream Storage	-Construct new storage north of Delta	Water Use	
	-Construct new storage facilities in Delta	Water Use	Upstream of Delta/In Delta only
	-Enlarge existing off-stream storage reservoirs	Water Use	Upstream of Delta/In Delta only
	-Modify operations of existing off-stream reservoirs	Water Use	Upstream of Delta/In Delta only
Groundwater Banking and Conjunctive Use	-Modify California Water Code to encourage conjunctive use	Water Use	
	-Establish conjunctive use programs	Water Use	Upstream of Delta/In Delta only
	-Store groundwater north of Delta	Water Use	
	-Implement techniques to increase groundwater recharge	Water Use	Upstream of Delta/In Delta only
Improvement of Through-Delta Conveyance	-Increase capacities of existing east-side channels	Water Use	
	-Increase flows from the Sacramento R. to the Central Delta	Water Use	
	-Modify Delta levees to increase flow cross-sections	Water Use	

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	-Expand existing intakes at the Delta export facilities	Water Use	Upstream of Delta/In Delta only
Long-Term Planning for Drought Contingencies	-Increase water storage capacities at user locations	Water Use	
	-Establish long-term guarantees for management	Institutional	
	Establish institution to implement guarantees	Institutional	
Integration of Land-Use and Water-Supply Planning	Coordinate land uses with water supplies	Institutional	
Installation and Operation of Flow Barriers	-Install flow barriers to manage South Delta quality	Water Quality	
	Install weirs to control salinity intrusion	Water Quality	
Management of Agricultural Drainage	Manage drainage timing to reduce instream impacts	Water Quality	
	Dilute pollutants in Delta inflows from SJR using stored water	Water Quality	
Management of Urban and Wastewater Discharge	-Increase key nutrient inputs to estuary	Water Quality	
Improvement of Flooding & Seismic Protections	-Relocate levees to more stable sites	Land use/levees/flood control	
	-Widen floodways to increase flood conveyance	Land use/levees/flood control	
	-Establish and manage flood overflow areas	Land use/levees/flood control	
Rerouting and Protection of Infrastructure	-Maintain/reconstruct levees around infrastructure	Land use/levees/flood control	
	-Reconstruct infrastructure to increase reliability	Land use/levees/flood control	
	-Relocate/reroute infrastructure	Land use/levees/flood control	
	Establishment of Long-Term Funding Mechanisms	Institutional	

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